

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A polymer matrix composite material, comprising:
 - (1) a polyurethane formed by reaction of a reaction mixture, comprising:
 - (a) one or more monomeric or oligomeric poly- or di-isocyanates;
 - (b) a first polyol selected from the group consisting of polyether polyols and polyester polyols, the first polyol having a first molecular weight hydroxyl number; and
 - (c) a second polyol selected from the group consisting of polyether polyols and polyester polyols, the second polyol having a second hydroxyl number molecular weight greater than the first molecular weight less than the first hydroxyl number, and forming the polyurethane, wherein the polyurethane is less rigid than a second polyurethane that would be formed by the reaction of the first polyol and the one or more monomeric or oligomeric poly- or di-isocyanates in the absence of the second polyol, and wherein the second polyol is between about 5 wt % and about 20 wt %, based on the total weight of the first and second polyols being 100 wt %; and
 - (2) about 60 to about 85 wt% of an inorganic particulate material, based on the total weight of the composite material.
2. (Original) The polymer matrix composite material of claim 1, wherein the material is foamed.
3. (Original) The polymer matrix composite material of claim 1, further comprising one or more inorganic fibers disposed throughout the polymer matrix.
4. (Original) The polymer matrix composite material of claim 1, further comprising axially oriented fiber rovings disposed on, in, or beneath the surface of the composite.
5. (Canceled)
6. (Canceled)
7. (Previously Presented) The polymer matrix composite material of claim 1, wherein the inorganic particulate material is one or more of a fly ash, bottom ash, or particulate glass.

Appl. No. : **10/764,012**
Filed : **January 23, 2004**

8. (Original) The polymer matrix composite material of claim 1, wherein the inorganic particulate material has a particle size distribution ranging from about 0.0625 in. to below about 325 mesh.

9. (Original) The polymer matrix composite material of claim 1, wherein the inorganic particulate material contains less than about 0.5 wt% water.

10. (Canceled)

11. (Canceled)

12. (Canceled)

13. (Canceled)

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. (Canceled)

23. (Canceled)

24. (Canceled)

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Previously Presented) The polymer matrix composite material of claim 1, wherein the composite material is self-skinning.

29. (Previously Presented) The polymer matrix composite material of claim 1, having a density ranging from about 20 to about 90 lb/ft³.

30. (Previously Presented) The polymer matrix composite material of claim 1, having a density ranging from about 20 to about 60 lb/ft³.

31. (Previously Presented) The polymer matrix composite material of claim 1, wherein the polymer matrix composite material additionally comprises a polyisocyanurate formed by reaction of the monomeric or oligomeric poly- or di-isocyanate with water.

32. (Previously Presented) The polymer matrix composite material of claim 1, wherein the monomeric or oligomeric poly- or di-isocyanates comprise a methylene diphenyl diisocyanate (MDI).

33. (Previously Presented) The polymer matrix composite material of claim 32, wherein the MDI has a viscosity ranging from about 25 to about 200 cp at 25 °C.

34. (Previously Presented) The polymer matrix composite material of claim 32, wherein the MDI has an NCO content ranging from about 30% to about 35%.

35. (Previously Presented) The polymer matrix composite material of claim 32, wherein the MDI provides at least one equivalent NCO group to one equivalent OH group from the polyols.

36. (Previously Presented) The polymer matrix composite material of claim 35, wherein the MDI provides about 5% to about 10% excess NCO groups.

37. (Previously Presented) The polymer matrix composite material of claim 1, wherein the ratio of isocyanates to polyols, based on equivalent weights, is from about 0.5:1 to about 1.5:1.

38. (Previously Presented) The polymer matrix composite material of claim 37, wherein the ratio of isocyanates to polyols, based on equivalent weights, is from about 0.8:1 to about 1.1:1.

39. (Canceled)

40. (Currently Amended) The polymer matrix composite material of claim [[39]] 1, wherein the ratio of the second polyol to the first polyol is about 15 wt%.

41. (Previously Presented) The polymer matrix composite material of claim 3, wherein the one or more inorganic fibers disposed in the polymer matrix are present in amounts less than 10 % by weight, based on the total weight of the material.

42. (Previously Presented) The polymer matrix composite material of claim 1, wherein the first and the second polyols are non-EO tipped polyols.

43. (Previously Presented) The polymer matrix composite material of claim 1, wherein the first polyol is about 6 to about 18 wt% and the second polyol is greater than 0 to about 10 wt%, based on the total weight of the composite material.

44. (Currently Amended) A polymer matrix composite material, comprising:
a polyurethane formed by reaction of a reaction mixture, comprising:
one or more monomeric or oligomeric poly- or di-isocyanates;
a first non-EO tipped polyol selected from the group consisting of
polyether polyols and polyester polyols, the first polyol having a first molecular weight-hydroxyl number; and
a second non-EO-tipped polyol selected from the group consisting of
polyether polyols and polyester polyols, the second polyol having a second hydroxyl number molecular-weight greater than the first molecular-weight less than the first hydroxyl number and forming the polyurethane, wherein the
polyurethane is less rigid than a second polyurethane that would be formed by the
reaction of the first polyol and the one or more monomeric or oligomeric poly- or
di-isocyanates in the absence of the second polyol; and
about 60 to about 85 wt% of an inorganic particulate material, based on the total
weight of the composite material.

45. (Currently Amended) A polymer matrix composite material comprising:
a polyurethane formed by reaction of a reaction mixture, comprising:
one or more monomeric or oligomeric poly- or di-isocyanates;
a first polyol selected from the group consisting of polyether polyols and
polyester polyols, the first polyol having a first molecular-weight-hydroxyl number; and
a second polyol selected from the group consisting of polyether polyols
and polyester polyols, the second polyol having a second hydroxyl number molecular-weight greater than the first molecular-weight less than the first hydroxyl number and forming the polyurethane, wherein the polyurethane is less
rigid than a second polyurethane that would be formed by the reaction of the first
polyol and the one or more monomeric or oligomeric poly- or di-isocyanates in
the absence of the second polyol; and

about 60 to about 85 wt% of an inorganic particulate material, based on the total weight of the composite material,

wherein the polymer matrix composite material has a flexural strength of at least 1929 psi.

46. (Previously Presented) The polymer matrix composite material of Claim 45, wherein the flexural strength is at least 2786 psi.

47. (Previously Presented) The polymer matrix composite material of Claim 45, wherein polymer matrix composite material has a flexural modulus of 118,331 psi.

48. (Previously Presented) The polymer matrix composite material of Claim 1, wherein the inorganic particulate material is one or more of a fly ash and bottom ash.

49. (Previously Presented) The polymer matrix composite material of Claim 48, wherein the inorganic particulate material is present in an amount from about 80 wt% to about 85 wt%, based on the total weight of the composite material.

50. (Previously Presented) The polymer matrix composite material of Claim 49, having a density ranging from about 20 to about 41 lb/ft³.

51. (Previously Presented) The polymer matrix composite material of Claim 49, having a density ranging from about 31 to about 38 lb/ft³.

52. (Previously Presented) The polymer matrix composite material of Claim 48, wherein the inorganic particulate material is present in an amount from greater than 80 wt% to about 85 wt%, based on the total weight of the composite material.

53. (Previously Presented) The polymer matrix composite material of Claim 48, having a flexural strength of at least 1319 psi.

54. (Previously Presented) The polymer matrix composite material of Claim 48, having a flexural strength from 1319 psi to 1929 psi.

55. (Previously Presented) The polymer matrix composite material of Claim 51, having a flexural strength of from 1319 psi to 1650 psi.

56. (Previously Presented) The polymer matrix composite material of Claim 48, having a density ranging from about 20 to about 41 lb/ft³.

57. (Previously Presented) The polymer matrix composite material of Claim 48, having a density ranging from about 31 to about 38 lb/ft³.

58. (Previously Presented) The polymer matrix composite material of Claim 48, wherein the material is foamed.

59. (Previously Presented) The polymer matrix composite material of Claim 1, wherein the composite material comprises extruded composite material.

60. (Previously Presented) The polymer matrix composite material of Claim 44, wherein the composite material comprises extruded polyurethane and inorganic particulate material.

61. (Previously Presented) The polymer matrix composite material of Claim 45, wherein the composite material comprises extruded polyurethane and inorganic particulate material.

62. (New) A polymer matrix composite material, comprising:

(1) a polyurethane formed by reaction of a reaction mixture, comprising:

(a) one or more monomeric or oligomeric poly- or di-isocyanates;

(b) a first polyol selected from the group consisting of polyether polyols and polyester polyols, the first polyol having a first hydroxyl number; and

(c) a second polyol selected from the group consisting of polyether polyols and polyester polyols, the second polyol having a second hydroxyl number less than the first hydroxyl number, and forming the polyurethane, wherein the polyurethane is less rigid than a second polyurethane that would be formed by the reaction of the first polyol and the one or more monomeric or oligomeric poly- or di-isocyanates in the absence of the second polyol; and

(2) about 60 to about 85 wt% of an inorganic particulate material, based on the total weight of the composite material.

63. (New) The polymer matrix composite material of Claim 62, wherein the first polyol is in an amount of about 6 to about 18 wt%, and the second polyol is an amount of up to 10 wt%, based on the total weight of the composite material.

64. (New) The polymer matrix composite material of Claim 62, wherein the composite material comprises extruded polyurethane and inorganic particulate material.

65. (New) The polymer matrix composite material of Claim 62, wherein the first polyol has a first molecular weight, and the second polyol has a second molecular weight, wherein the first molecular weight is less than the second molecular weight.